Unhappily, one or two of the "Higher Critics" have gone much too far with their textual criticism, and honestly, but mistakenly, have invented a new Old Testament of their own imagining, and a very dull and uninspired thing at that. The text of the real Book is often obscure, and not seldom corrupt, so that it must be emended, but not so much so as to be a sort of Bacon-Shakespeare cryptogram which can be elucidated only by methods strongly reminiscent of Mrs. Gallup! The "Higher Criticism" does not connote this sort of fantasy; what it really is Mr. Grubb shows with both knowledge and skill. From his little book the interested reader can see just how far archæological discovery has confirmed the general historical character of the legendary and annalistic books of the Old Testament, and he will be able to realise what "textual criticism" means in the case of Hebrew manuscripts; the distinctions between the different schools of early Jewish religious writers that "wrote the Bible"—the Jahvist ("J"), the Elohist ("E"), and the Priestly ("P") writers—will be made clear to him. He will also be able to understand the fact of the various "strata" of Isaiah, which can be printed, if necessary, in different colours to distinguish them.

The Bible, treated scientifically and subjected to the same criticism as any other collection of ancient legends and poems, becomes extraordinarily interesting. If the sacred books of a religion cannot stand criticism, they are not worth much. The "Book of Mormon" cannot stand criticism; the Holy Bible can and does. Literal truth at all times and in all places is not the question. Christianity does not stand or fall by the "verbal inspiration" or literal "truth" of the Old Testament, but rests foursquare and secure on the teaching of its Founder as given to us in the New. He regarded the scriptures of His ancestors with the same reverence that we do, who seek out and study their origins and growth in order that we may the better understand the bases of our faith and so teach it *ad majorem Dei gloriam*. H. H.

Zoology for Medical Students.

An Introduction to Zoology. By Prof. C. H. O'Donoghue. Pp. x+501. (London: G. Bell and Sons, Ltd., 1920.) 16*s*. net.

THE object of this volume is to provide a text-book for the zoological portion of the syllabus in biology for the first examination for medical degrees of the University of London, and for the first examination of the Conjoint Examining Board in England.

For an introduction to zoology for medical students, the subjects discussed, the degree of fullness of treatment, and the order of their presentation are admirably suited. After a preliminary chapter, the frog is first treated as an introduction to anatomy, physiology, and histology; then follow accounts of two free-living and two parasitic Protozoa—Amœba and Paramæcium, Monocystis and the malaria parasite. A chapter is given to Hydra and Obelia, and another to the earthworm and Tænia, while the dogfish is treated at length. An account of the rabbit takes up nearly 100 pages, and this section includes—an excellent addition—descriptions of the skull of the dog, and of the brain and heart of the sheep. A chapter on histology and cytology follows, which deals mainly with cytology, including spermatogenesis and oogenesis; the section on embryology introduces the early development of Amphioxus and of the frog (which finds its place here instead of in the earlier chapters); while the chick and rabbit are treated more completely. A final chapter is devoted to evolution, variation, and heredity.

The present writer is convinced that such a course, beginning with a fairly full account of an animal that goes on four legs, the internal arrangements of which correspond in some degree with what the beginner already knows of his own body, and then working upwards from the Protozoa, is, as the author has found, the most satisfactory from the point of view of both teacher and student. The number of forms to be studied must be sufficiently large to serve as a basis for the wider appreciations and generalisations on the comprehension of which the value of the course to the medical student depends. Medicine is applied biology, and if the student does not grasp the fundamentals at this stage he will not do so from the specialised study of human anatomy and physiology at a later period. At the same time, as the author implies, the multiplication of types beyond what is strictly necessary to illustrate fundamental principles is to be deprecated as involving a study of unnecessary details. In the present state of the medical curriculum there is no excuse for presenting the ordinary student with a survey of the whole animal kingdom—a practice that perhaps still survives in places. A complete study of a few well-chosen forms, with similarly thorough laboratory work on those forms, is worth more for the purpose of giving an insight into biological principles—and infinitely more as a training in scientific method and thoroughness—than skimming over all or most of the phyla of Invertebrates and the classes, or even orders, of the Vertebrates.

A few criticisms of details are necessary. The account of the physiology of digestion is, quite

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suitably, an account of mammalian digestion, but this should be stated; instead, it is said to be an account of the physiology of digestion in general. The respiratory movements in the frog are badly explained; if they took place as described, no air would ever be expelled to the exterior, and the animal would ultimately burst. Also the description of the frog's truncus arteriosus is not easy to follow, and there is no explanation of how its mechanism works, and no statement that the arterial arches contain blood of different degrees of oxygenation. The author appears to distinguish ague from malaria ("three distinct diseases, malaria and two kinds of ague"); while only the maximum recorded length (36 metres) is given for *Taenia saginata,* which is surely liable to mislead the student as to its usual dimensions.

The last chapter, which is so important, is too compressed; the subjects of the forty-two pages include evolution; variation, heredity, and selection in connection with the Darwinian theory; Mendelism; and palæontology as illustrated especially by the reptiles; while the topics of the evolution of sex and its meaning do not appear to find a place. Some of the figures introduced from Bourne's "Comparative Anatomy of Animals" have suffered considerably—*e.g.* those of the nephridium of the earthworm and of the skeleton of Scyllium; they are unworthy of a place in the book.

Errors which have been noted are as follows: A trochanter is a prominence, not a depression (p. 30); to say that membrane bones are "formed by bone tissue being laid down in a membrane" is neither adequate nor correct. Among misprints one might note "Calkin," "Bütchli," "Weissmann," "strobilla," "alteration" (of generations), "aborizations" (p. 95), "cœcum" and "stomodœum" for "cæcum" and "stomodæum," and "anistropic" (p. 42). "Pre-caval" contains an unnecessary hyphen, while in "sub-cutaneous" and "sub-clavian" it is more than unnecessary.

The author, in his preface, acknowledges his indebtedness to Profs. Dendy and Hill, especially to the latter, on whose lecture-notes parts of the book are more or less directly based.

The Analysis of Steel.

The Chemical Analysis of Steel-Works' Materials. By F. Ibbotson. Pp. viii+296. (London: Longmans, Green, and Co., 1920.) 21*s.* net.

THE "Analysis of Steel-Works' Materials" of Brearley and Ibbotson has long enjoyed a reputation as a sound and trustworthy manual of the subject with which it deals, and its contents are familiar to most steel analysts. The revision of the work has been undertaken by one of the authors only, and advantage has been taken of the occasion to extend the treatment of steels, alloys, slags, etc., on the analytical side, and to gain space for such extensions by omitting the sections of the earlier work dealing with pyrometry and the use of the microscope. In the interval which has elapsed since the original publication many books on these two subjects have made their appearance, and their development has been so rapid that it has become undesirable to attempt their treatment in the course of a few short chapters in a work devoted mainly to a different branch of the subject. Mr. Ibbotson's experience of the analysis of steel-works' materials is exceptionally wide, and the methods which he describes have been in all cases personally tested and compared with alternative processes, so that the author may be accepted as a safe guide, especially in the difficult region of the analysis of high-speed tool steels and other complex alloys containing the rarer metals.

The separation of the rarer elements has been worked out with great care for the purposes of mineral analysis, and it is possible, by following somewhat laborious methods, to effect a complete separation of the metals contained in a mineral with a high degree of accuracy, as has been shown more particularly by American work on the composition of rocks. The analysis of complex steels, however, calls for processes which are rapid as well as accurate, since the results are usually required for commercial purposes within the shortest possible time. The high cost of the rarer alloy metals makes their exact estimation very important, whilst certain alloy steels are remarkably sensitive to minute variations in the proportions of the added elements, so that to devise methods which will yield, in the hands of the works chemist, results of the required accuracy in a reasonably short time is a task of some difficulty. The author lays great stress on accuracy, so that while his methods are not invariably the most rapid, they are such as can be trusted where a gain in speed might possibly be accompanied by a serious risk of error.

The work differs a little in its arrangement from most text-books on the subject. The opening chapter deals with certain reactions of a more or less general character, including the separation of iron from other metals, the reduction of solutions by nascent hydrogen by means of the Jones reductor, and the precipitation of chromium, molybdenum, tungsten, and vanadium by means

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